

TITLE OF THE INVENTION

CLEANING DEVICE FOR MEDICAL INSTRUMENT

CROSS-REFERENCE TO RELATED APPLICATIONS

5 This application is based upon and claims the  
benefit of priority from the prior Japanese Patent  
Application No. 2002-268730, filed September 13, 2002,  
the entire contents of which are incorporated herein by  
reference.

BACKGROUND OF THE INVENTION

10 1. Field of the Invention

The present invention relates to a device for  
cleaning medical instruments including treatment  
portions in insertion portions.

2. Description of the Related Art

15 In Jpn. Pat. Appln. KOKAI Publication  
No. 2000-296135, an ultrasonic treatment instrument has  
been proposed as a surgical treatment instrument.  
In general, the ultrasonic treatment instrument  
includes a handle unit including an insertion portion,  
20 a probe unit attached to the handle unit, and  
a vibrator unit for driving a probe. A jaw which is  
an open/close member for grasping the ultrasonic  
treatment instrument is attached to a tip end of the  
insertion portion of the handle unit. This jaw is  
25 connected to an operation rod inserted in a channel  
formed in the insertion portion of the handle unit, and  
is rotated/operated, when the operation rod is moved

forwards/backwards by a handle of the handle unit.  
A probe of the probe unit is inserted through  
the insertion portion of the handle unit, and the  
distal-end portion of the probe is disposed opposite  
5 to the jaw. Moreover, a tissue is treated by the  
distal-end portion of the probe and the jaw.

Since this type of ultrasonic treatment instrument  
is a medical instrument, the instrument needs to be  
cleaned every use. To clean the ultrasonic treatment  
10 instrument, simple cleaning methods such as brush  
cleaning and shower cleaning in running water have  
heretofore been carried out.

In this conventional cleaning method, however,  
especially a cleaning efficiency of a treatment portion  
15 including a complicated structure is deteriorated, a  
lot of trouble and much time are required for cleaning  
the treatment portion, and efficiency of a cleaning  
operation of an endoscope has been bad.

#### BRIEF SUMMARY OF THE INVENTION

20 An object of the present invention is to provide a  
cleaning device for a medical instrument, capable of  
efficiently cleaning a treatment portion of the medical  
instrument which easily becomes dirty.

According to an aspect of the present invention,  
25 there is provided a cleaning device which cleans a  
treatment portion of a medical instrument, comprising:

a cleaning cover including a containing portion

which surrounds the treatment portion and which contains the treatment portion, and an insertion opening via which the treatment portion is inserted into the containing portion;

5           an engagement portion which engages with the medical instrument including the treatment portion inserted in the containing portion via the insertion opening and which holds the medical instrument in the cleaning cover;

10           a water supply port which is disposed in the cleaning cover and which communicates with the containing portion and which supplies cleaning water into the containing portion; and

15           a drain port which is disposed in the cleaning cover and which communicates with the containing portion and via which the cleaning water in the containing portion is drained to the outside of the cleaning cover.

20           According to another aspect of the present invention, there is provided a cleaning device which cleans a treatment portion of a medical instrument, comprising:

25           a cleaning cover including a containing portion which surrounds the treatment portion and which can contain the treatment portion, and an insertion opening via which the treatment portion is inserted in the containing portion;

an engagement portion which engages with the medical instrument including the treatment portion inserted in the containing portion via the insertion opening and which holds the medical instrument in the  
5 cleaning cover;

a water supply port which supplies cleaning water into the containing portion;

a plurality of water supply nozzles which are disposed in an inner wall of the containing portion  
10 and which are arranged radially centering on an installation position middle of the treatment portion contained in the containing portion;

a water supply channel which communicates the water supply nozzle and the water supply port and which  
15 supplies the cleaning water to the water supply nozzle; and

a drain port which is connected into the containing portion and which drains the cleaning water of the containing portion to the outside of the  
20 cleaning cover.

According to a further aspect of the present invention, there is provided a cleaning device which cleans a treatment portion of a medical instrument, comprising:

25 a cleaning cover including a containing portion which surrounds the treatment portion and which contains the treatment portion, and an insertion

opening via which the treatment portion is inserted in the containing portion;

an engagement portion which engages with the medical instrument including the treatment portion  
5 inserted in the containing portion via the insertion opening;

a water supply nozzle which is disposed in an inner wall of the containing portion and which opens toward the treatment portion contained in the  
10 containing portion;

a water supply port which communicates with the water supply nozzle and which supplies cleaning water into the containing portion; and

a plurality of drain ports which are arranged in  
15 the cleaning cover and which communicates with the containing portion and via which the cleaning water in the containing portion is drained to the outside of the cleaning cover.

Advantages of the invention will be set forth in  
20 the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. Advantages of the invention may be realized and obtained by means of the instrumentalities and combinations particularly pointed  
25 out hereinafter.

#### BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

The accompanying drawings, which are incorporated

in and constitute a part of the specification,  
illustrate embodiments of the invention, and together  
with the general description given above and the  
detailed description of the embodiments given below,  
5 serve to explain the principles of the invention.

FIG. 1 is a side view of an assembled state of an  
ultrasonic treatment instrument;

FIG. 2 is a side view of a handle unit of the  
ultrasonic treatment instrument;

10 FIG. 3A is a side view of a probe unit;

FIG. 3B is a side view vibrator unit of the  
ultrasonic treatment instrument;

FIG. 4A is a vertical sectional view of an  
insertion sheath portion in the handle unit of the  
15 ultrasonic treatment instrument;

FIG. 4B is a transverse sectional view of the  
insertion sheath portion in the handle unit along a  
line 4A-4A in FIG. 4A;

FIG. 4C is a vertical sectional view of the  
20 insertion sheath portion in the handle unit in the  
vicinity of a part 4C in FIG. 4A;

FIG. 5 is a vertical sectional view of an  
operation portion in the handle unit of the ultrasonic  
treatment instrument;

25 FIG. 6 is a side view of a whole cleaning device  
according to the first embodiment of the present  
invention;

FIG. 7A is a vertical sectional view of the cleaning device;

FIG. 7B is a transverse sectional view of a part along line 7B-7B in FIG. 7A;

5           FIG. 8A is a vertical sectional view in a state in which the cleaning device is attached to the ultrasonic treatment instrument;

FIG. 8B is a transverse sectional view of a part along line 8B-8B in FIG. 8A;

10           FIG. 9 is a side view of the whole cleaning device according to a second embodiment of the present invention;

FIG. 10 is a vertical sectional view in a use state of the cleaning device according to the second  
15           embodiment;

FIG. 11 is a side view of the whole cleaning device according to a third embodiment of the present invention;

FIG. 12 is a vertical sectional view in a use  
20           state of the cleaning device according to a third embodiment;

FIG. 13 is a side view of the whole cleaning device according to a fourth embodiment of the present invention;

25           FIG. 14 is a rear view of the cleaning device according to the fourth embodiment;

FIG. 15 is a vertical sectional view in the use

state of the cleaning device according to the fourth embodiment; and

FIG. 16 is a transverse sectional view in the use state of the cleaning device according to the fourth embodiment.

#### DETAILED DESCRIPTION OF THE INVENTION

With reference to FIGS. 1 to 8, for example, a cleaning device for a surgical treatment instrument according to a first embodiment of the present invention will be described as a medical device.

The surgical treatment instrument which is a cleaning object in the present embodiment is an ultrasonic treatment instrument 1. The ultrasonic treatment instrument 1 includes a handle unit 2 shown in FIG. 2, a probe unit 3 shown in FIG. 3A, and a vibrator unit 4 shown in FIG. 3B. When the ultrasonic treatment instrument 1 is used, the respective units 2, 3, 4 are assembled as shown in FIG. 1.

As shown in FIG. 3B, the vibrator unit 4 includes a cylindrical exterior cover 5, and an ultrasonic vibrator and horn (not shown) are disposed in the exterior cover 5. A hand piece cord 7 to be electrically connected to a power supply (not shown) is connected to a base end of the vibrator unit 4.

A power for driving is supplied to the ultrasonic vibrator from the power supply via the hand piece cord 7 to drive the ultrasonic vibrator. A connection



portion 9 to be connected to the handle unit 2 is formed in a front peripheral edge of the vibrator unit 4.

As shown in FIG. 3A, the probe unit 3 includes  
5 a rod-shaped vibration transmission member 10, and ultrasonic vibration generated in the ultrasonic vibrator of the vibrator unit 4 is transmitted to a distal-end treatment portion by this rod-shaped vibration transmission member 10. A male screw 11 to  
10 be screwed in a female screw formed in the tip end of the horn is formed in a proximate-end position of the vibration transmission member 10. Furthermore, the vibration transmission member 10 includes: a conical proximate-end horn 12 for enlarging an amplitude of the  
15 ultrasonic vibration amplified by the horn on the side of the vibrator unit 4 further into a second stage; a middle portion 13 positioned on the side of a tip end of the proximate-end horn 12; a conical distal-end horn 14, positioned on the side of the tip end of the middle  
20 portion 13, for enlarging the amplitude of the ultrasonic vibration amplified by the proximate-end horn 12 into a final stage; and a cylindrical tip end 15 positioned on the side of the tip end of the distal-end horn 14. The ultrasonic vibration generated in  
25 the ultrasonic vibrator is gradually amplified by the horn of the vibrator unit 4, the proximate-end horn 12 in the vibration transmission member 10, and the

distal-end horn 14, and is transmitted to the tip end  
15 of the vibration transmission member 10. In the  
middle portion 13 of the vibration transmission member  
10, a plurality of flange-shaped support members 16 are  
5 positioned in second and subsequent nodes on the side  
of the tip end of the transmitted ultrasonic vibration.

As shown in FIG. 2, the handle unit 2 includes  
an operation portion 19, an insertion sheath portion 17  
including a longitudinal overcoat tube 20 rotatably  
10 attached to the operation portion 19, and a distal-end  
function portion (treatment portion) 21 disposed in the  
tip end of the insertion sheath portion 17. The  
operation portion 19 of the handle unit 2 includes an  
operation portion main body 22, a fixed handle 23  
15 formed integrally with the operation portion main body  
22, and a movable handle 25 rotatably attached to the  
operation portion main body 22 via a handle support  
shaft 24.

As shown in FIG. 5, a cylindrical joint member 32  
20 disposed in the operation portion main body 22 via  
a pipe fixing member 31 is fixed/connected to the  
proximate-end portion of the insertion sheath  
portion 17. The joint member 32 is attached to the  
operation portion main body 22 by a fixing ring 33 so  
25 as to rotatable around an insertion portion axis. A  
rotary operation knob 34 is fixed to the joint  
member 32. When the rotary operation knob 34 is

rotated/operated, the insertion sheath portion 17 can be rotated/operated around a sheath axis.

A cylindrical driving force transmission intermediate member 38 to be connected to an operation rod 60 described later is fitted in the joint member 32 so as to be movable in an insertion portion axial direction. A pin 39 is attached to a rear-end portion of the driving force transmission intermediate member 38. This pin 39 is fitted/engaged in a guide groove 41 which is cut/formed in the joint member 32 so as to extend in the insertion portion axial direction. This regulates the rotation of the driving force transmission intermediate member 38 and allows only the movement into the insertion portion axial direction. An O ring 42 is fitted around the outer periphery of the distal-end portion of the driving force transmission intermediate member 38, and the O ring 42 is disposed between the driving force transmission intermediate member 38 and joint member 32.

Moreover, as shown in FIG. 5, a distal-end outer peripheral portion of a slider receiver member 45 is screwed in the driving force transmission intermediate member 38, and both the portion and the member are coaxially assembled/fixed. A slider member 46 is slidably fitted in the outer periphery of the driving force transmission intermediate member 38 on the side of the rear end. A coiled spring 47 is wound around

the outer periphery of the slider receiver member 45 between the driving force transmission intermediate member 38 and the slider member 46.

5 A first packing 48 in the form of the O ring is attached to the inner surface of the driving force transmission intermediate member 38. When the probe unit 3 is attached to the handle unit 2, the first packing 48 is bonded to the outer periphery of the vibration transmission member 10 of the probe unit 3 to  
10 hold the vibration transmission member 10 and to close a gap between the units. A second packing 49 having the O-ring shape is also attached to a hand-side end of the slider receiver member 45. When the probe unit 3 is attached to the handle unit 2, the second packing 49  
15 is bonded to the outer periphery of the vibration transmission member 10 of the probe unit 3 to hold the vibration transmission member 10 and to close the gap between the units.

20 Since the packings 48, 49 are disposed in this manner, for example, aeroperitoneum gas at the time of a surgical operation under an abdominoscope can be prevented from passing through an inner gap from an insertion portion tip end and leaking. Since two packings 48, 49 are both formed of a rubber, and  
25 elastic, the vibration transmission member 10 to ultrasonically vibrate is steadily supported without any difficulty.

An engaging pin 51 to engage with the slider member 46 in the operation portion main body 22 is disposed in the movable handle 25 of the handle unit 2. When the movable handle 25 is rotated centering on the handle support shaft 24, the movement of the movable handle 25 is transmitted to the slider member 46 via the engaging pin 51. Since the helical compression spring 47 is constantly attached in a compressed/urged state, a certain or more operation force applied to the movable handle 25 in a closing direction is absorbed by deformation of the helical compression spring 47. Accordingly, the slider receiver member 45 is slid/operated in a state in which an overload applied to the slider receiver member 45 is prevented.

As shown in FIG. 5, a vibrator connection portion 52 for detachably attaching the vibrator unit 4 is disposed in a rear-end portion of the handle unit 2 in the operation portion main body 22. The vibrator connection portion 52 includes a cylindrically formed frame member 53 and a cylindrical connection member 54. The frame member 53 and connection member 54 are screwed/fixed into the inner surface of the operation portion main body 22. A screwed/fixed portion of the frame member 53 is positioned before the connection member 54. The rear-end portion of the frame member 53 is concentrically disposed inside the connection member 54. When the vibrator unit 4 is attached to the handle

unit 2, a front-end portion of the cylindrical exterior cover 5 of the vibrator unit 4 is fitted between the frame member 53 and connection member 54. The connection portion 9 of the vibrator unit 4 is fitted into/engaged with a distal-end engagement portion 55 of the frame member 53, so that the vibrator unit 4 is fixed to the handle unit 2. The connection portion 9 is formed, for example, by a C ring so as to swell outwards. A plurality of through-holes 56 are appropriately scattered and disposed in a wall portion of the frame member 53.

Next, the insertion sheath portion 17 of the handle unit 2 will be described. As shown in FIG. 4A, the overcoat tube 20 of the insertion sheath portion 17 includes an outer pipe (overcoat tube) 61 and an inner pipe 62, and the outer periphery of the outer pipe 61 is subjected to an electric insulating treatment by an insulating tube 63. In the electric insulation, the insertion sheath portion 17 may also be subjected to treatment means such as coating. As shown in FIG. 4B, the outer pipe 61 includes a main channel 65 for passing the vibration transmission member 10 of the probe unit 3, and a sub-channel 66 for passing the operation rod 60. Similarly, as shown in FIG. 4B, for the inner pipe 62 forming the main channel 65, a part of a circular sectional portion is crushed to be flat to form a gap as the sub-channel 66 between

the section and the inner surface of the outer pipe 61. A through-hole 67 is formed in one or more appropriate portions of the inner pipe 62 disposed opposite to the sub-channel 66, so that the main channel 65 can be  
5 connected to the sub-channel 66.

As shown in FIG. 4A, the distal-end function portion 21 of the handle unit 2 includes a distal-end chip member 71 attached to the distal-end portion of the outer pipe 61 and formed, for example, of a metal,  
10 and a single swing hold member 74 rotatably attached to the distal-end chip member 71 via a support shaft 72. This hold member 74 holds a grasp member 75. The tip end of the operation rod 60 is connected to the proximate-end portion of the hold member 74 via a  
15 support shaft 76. When the movable handle 25 is rotated to move the operation rod 60 forwards/backwards, the hold member 74 rotates, and an operation of opening/closing the distal-end function portion 21 is carried out. When the distal-end  
20 function portion 21 is disposed opposite to the distal-end portion 15 of the probe unit 3 in the vibration transmission member 10, and a living tissue of a treatment object is grasped by both the portions, a vibration energy is transmitted to the living tissue  
25 from the vibration transmission member 10.

Next, a cleaning device 80 for cleaning the ultrasonic treatment instrument 1 will be described.

As shown in FIGS. 6 and 7, the cleaning device 80 includes a cleaning cover 81 which has an elongated shape. For the cleaning cover 81, as shown in FIG. 7, an outer pipe 82 and inner pipe 83 are concentrically disposed and constituted in a double tube form, and a cylindrical member is constituted which can surround and contain a cleaning object portion of the ultrasonic treatment instrument 1. Both tip ends of the outer pipe 82 and inner pipe 83 are detachably fixed to a distal-end member 85 constituted of a cylindrical member including a relatively thick wall. Both rear ends of the outer pipe 82 and inner pipe 83 are detachably fixed to a nozzle member 86 constituted of a cylindrical member including a relatively thick wall. A peripheral edge in the tip end of the outer pipe 82 is screwed in a rear edge of the distal-end member 85. A peripheral edge in the tip end of the nozzle member 86 is screwed in a rear-end outer peripheral edge of the outer pipe 82. The outer pipe 82 is connected to the distal-end member 85 in a liquid-tight manner. The outer pipe 82 is also connected to the nozzle member 86 in the liquid-tight manner. The distal-end portion of the inner pipe 83 is fitted into the distal-end member 85 in the liquid-tight manner. The rear-end portion of the outer pipe 82 is fitted into the nozzle member 86 in the liquid-tight manner.

The outer pipe 82 and inner pipe 83 are formed by



transparent materials so that the inside can be seen through. The distal-end member 85 and nozzle member 86 may also be formed of the transparent materials, but are formed of metals and are opaque herein. In the present specification, the nozzle does not mean that the nozzle is limited to the metal material.

In the wall portion in the intermediate portion of the inner pipe 83, a plurality of jet ports (water supply nozzle ports) 87 are arranged at equal intervals in a circumferential direction of the pipe, and a plurality of arrays of jet ports 87 are arranged and formed in a pipe axial direction. A region in the inner pipe 83 where a plurality of jet ports 87 are arranged forms a cleaning region (containing portion) 88 for containing/arranging the cleaning object of the ultrasonic treatment instrument 1. A gap is made in the outer pipe 82 and inner pipe 83, and this gap forms a supply channel 89 for distributing the cleaning water to the respective jet ports 87.

An inner hole of the distal-end member 85 forms a drain port 90 leading into the cleaning cover 81. The cleaning water in the cleaning cover 81 is drained to the outside by the drain port 90.

One or more supply nozzles 91 are attachment the nozzle member 86. The cleaning water is supplied to the supply channel 89 via the respective supply nozzles 91. Two water supply tubes (not shown)

connected to a water supply such as a water supply tank and pump incorporated in the cleaning machine for the treatment instrument can separately be connected to each supply nozzle 91.

5           Fixing means, attached to the distal-end portion of the surgical treatment instrument, for holding the cleaning cover 81 is disposed in the rear-end portion of the nozzle member 86. The inner hole of the rear-end portion of the nozzle member 86 constitutes an  
10           insertion port for inserting the distal-end portion of the surgical treatment instrument. An elastic tube 92 is fitted into the inner hole of the rear-end portion of the nozzle member 86. In the nozzle member 86, an abutment portion 93 for receiving an inner end of the  
15           elastic tube 92 is formed in an inner end of a region in which the elastic tube 92 is fitted. A push-in ring 95 is screwed into the rear-end portion of the nozzle member 86. A flange 96 of the push-in ring 95 is brought into contact with an outer end of the elastic  
20           tube 92, and the push-in ring 95 is screwed into the nozzle member 86. Then, the elastic tube 92 is pushed in the axial direction, and the elastic tube 92 is compressed in the axial direction, so that an inner diameter of the elastic tube 92 can be reduced.  
25           An engagement portion is constituted to engage with the portion of the medical instrument 1 inserted via the insertion port constituted of the nozzle member 86 and

to hold the medical instrument 1 in the cleaning cover 81.

Next, a procedure and function will be described in a case in which the cleaning device 80 of the present embodiment is used to clean the ultrasonic treatment instrument 1.

The handle unit 2, treatment probe, and generation unit are assembled to use the ultrasonic treatment instrument 1 in the state shown in FIG. 1. Moreover, when the ultrasonic treatment instrument 1 is used, the ultrasonic treatment instrument 1 becomes dirty. Therefore, the instrument needs to be cleaned every use.

Rough dirt on the surface of the ultrasonic treatment instrument 1 can quickly be removed to a certain degree even by the shower cleaning by the treatment instrument cleaning machine or the exposure to the running water. However, the treatment portion such as the distal-end function portion 21 includes concave/convex portions and gaps. Since the portion has an especially complicated shape, degree of adhesion of dirt is strong. To remove the dirt from this portion, the cleaning efficiency is bad only with the shower cleaning or the exposure to the running water.

To solve the problem, the cleaning device 80 of the present embodiment is used to remove the dirt of the distal-end function portion 21. To clean the

ultrasonic treatment instrument 1, in a state in which the probe unit 3 is removed from the handle unit 2 of the ultrasonic treatment instrument 1 as shown in FIG. 8, the distal-end portion of the handle unit 2 in the insertion sheath portion 17 is covered with the cleaning cover 81, and the device is attached. That is, as shown in FIGS. 7A and 7B, the distal-end portion of the insertion sheath portion 17 of the handle unit 2 from which the probe unit 3 has been removed is inserted into the cleaning cover 81 of the cleaning device 80 to position the distal-end function portion (treatment portion) 21 in the cleaning region 88.

Next, as shown in FIGS. 8A and 8B, the push-in ring 95 is screwed in, the elastic tube 92 is compressed in the axial direction by the flange 96 of the push-in ring 95, and the inner diameter of the elastic tube 92 is reduced. Then, the elastic tube 92 tightens the outer periphery of the insertion sheath portion 17 inserted into the tube, and the cleaning cover 81 is fixed to the insertion sheath portion 17. Since the insertion sheath portion 17 is elastically fastened by the elastic tube 92 in this manner, an outer surface treatment layer of the insertion sheath portion 17 protected by the insulating tube 63 can be prevented from being damaged.

Subsequently, supply tube line means such as a water supply tube connected to the water supply is

individually connected to the respective supply  
nozzles 91. As the water supply, it is possible to use  
the water supply tank or pump incorporated in the  
cleaning machine for the treatment instrument in which  
5 the treatment instruments such as the ultrasonic  
treatment instrument are disposed to carry out the  
shower cleaning or running water cleaning. The water  
supply tube (not shown) connected to the water supply  
is connected to the supply nozzle 91.

10           Moreover, the high-pressure cleaning water  
pressurized from the water supply through the water  
supply tube is distributed to the jet ports (water  
supply nozzle ports) 87 through the supply passage 89,  
and the high-pressure cleaning water from the periphery  
15 is spouted toward the distal-end function portion  
(treatment portion) 21 positioned in the cleaning  
region 88 from the respective jet ports 87. Since the  
high-pressure cleaning water is vigorously spouted onto  
the distal-end function portion 21 from the periphery,  
20 solid dirt can be removed, and further every corner can  
securely be cleaned without any unevenness. Since the  
cleaning water is supplied to the supply channel 89  
from a plurality of supply nozzles 91, the high-  
pressure cleaning water can uniformly be distributed to  
25 the respective jet ports 87, and all the circumference  
can strongly be cleaned.

          In the cleaning operation, the ultrasonic

treatment instrument 1 together with the attached cleaning device 80 is installed in a cleaning tank of the cleaning machine or a cleaning tray of a cleaning unit, and an exterior portion of the ultrasonic

5 treatment instrument 1 is preferably subjected to the shower cleaning or exposed to the running water and is also cleaned.

When connected portions of screwed portions are disconnected, the respective components of the cleaning  
10 device 80 can all be disassembled. Especially, the distal-end member 85, nozzle member 86, outer pipe 82, and inner pipe 83 can easily be disassembled, when the distal-end member 85 and nozzle member 86 are removed from the outer pipe 82. Therefore, the components of  
15 the cleaning device 80 can also easily be cleaned.

The cleaning device according to a second embodiment of the present invention will be described with reference to FIGS. 9 and 10. In the present embodiment, the same components as those of the first  
20 embodiment are denoted with the same reference numerals, and the detailed description is omitted.

In a cleaning device 100 according to the present embodiment, a front-end plate 102 and rear-end plate 103 are attached to front and rear ends of  
25 a cylindrical member 101 to close openings of the cylindrical member 101. Accordingly, a cleaning cover 104 is constituted to surround the cleaning region.

The front-end plate 102 and rear-end plate 103 are screwed into and attached to the front-end and rear-end portions of the cylindrical member 101 so as to be attachable/detachable.

5           Fixing means which engages with the distal-end portion of the surgical treatment instrument to hold the cleaning cover 104 in the surgical treatment instrument is disposed in the rear-end plate 103. The fixing means includes a hold cylinder 115 for  
10           passing the insertion sheath portion 17 of the ultrasonic treatment instrument 1, the hold cylinder 115 is disposed coaxially with the cleaning cover 104, and the insertion sheath portion 17 of the ultrasonic treatment instrument 1 is passed through the cylinder.  
15           A front end of the hold cylinder 115 is screwed into the rear-end plate 103, and the hold cylinder is fixed to the rear-end plate 103 so as to be attachable/detachable.

          As shown in FIG. 10, an elastic tube 116 is fitted  
20           into the hold cylinder 115. A part of the outer periphery of the elastic tube 116 is meshed with a screw portion 117 formed in the inner surface of the hold cylinder 115, and is bonded if necessary. Accordingly, the elastic tube 116 is fixed to the hold  
25           cylinder 115. When the insertion sheath portion 17 of the ultrasonic treatment instrument 1 is inserted through the hold cylinder 115, the elastic tube 116

contacts the outer periphery of the insertion sheath portion 17 with pressure, and engages with the insertion sheath portion 17.

5 A supply nozzle 121 is disposed coaxially with the cleaning cover 104 in the front-end plate 102 of the cleaning cover 104, screwed into the front-end plate 102, and accordingly attached. The supply tube line means such as the water supply tube connected to the water supply is connected to the supply nozzle 121. In  
10 an inner end of the supply nozzle 121, a water supply port 122 is formed and opened toward the cleaning region in the cleaning cover 104. The supply nozzle 121 and hold cylinder 115 are arranged on a central axis of the cleaning cover 104, and a hold axis by the  
15 hold cylinder 115 is constituted so as to agree with a jet direction of the water supply port 122.

Drain ports 125 are formed in the cylindrical member 101, front-end plate 102, and rear-end plate 103 of the cleaning cover 104, respectively, and the  
20 cleaning water which has overflowed in the cleaning region in the cleaning cover 104 is drained to the outside of the cleaning cover 104 via the drain ports 125.

When the cleaning device 100 according to the  
25 present invention is used, in the same manner as in the first embodiment, the distal-end portion of the insertion sheath portion 17 in the handle unit 2 from



which the probe unit 3 has been removed is inserted into the hold cylinder 115 to position the distal-end function portion (treatment portion) 21 in the cleaning region in the cleaning cover 104.

5           Through the supply tube line means such as the water supply tube connected to the water supply, the high-pressure cleaning water is directed toward the cleaning region in the cleaning cover 104 from the water supply port 122 opened in an inner end of the  
10           supply nozzle 121 and spouted onto the distal-end function portion 21. Since the high-pressure cleaning water is vigorously spouted onto the distal-end function portion 21, even greasy dirt is removed. The cleaning water which has overflowed into the cleaning  
15           cover 104 is drained to the outside of the cleaning cover 104 via the drain ports 125. The drain ports 125 are formed in the respective wall portions of the cleaning cover 104 surrounding the cleaning object. Therefore, even when the cleaning cover 104 is disposed  
20           in any arrangement, the cleaning water can be drained to the outside of the cleaning cover 104 through any drain port 125. Therefore, the cleaning water does not remain in the cleaning cover 104, and the cleaning efficiency is enhanced.

25           In the cleaning, the cleaning device 100 together with the attached ultrasonic treatment instrument 1 is disposed in the cleaning tank of the cleaning machine

or in the cleaning tray of the cleaning unit, and the exterior portion of the ultrasonic treatment instrument 1 is preferably simultaneously cleaned by the shower cleaning or by the exposure into the running water.

5           The respective components of the cleaning device 100 can all be disassembled, when the connected portion of the screw-in portion is removed. It is easy to clean these components.

10           The cleaning device according to a third embodiment of the present invention will be described with reference to FIGS. 11 and 12. In the present embodiment, the same components as those of the first and second embodiments are denoted with the same reference numerals, and the detailed description  
15           thereof is omitted.

          The cleaning device 100 of the present embodiment is different from that of the second embodiment only in the fixing means held in the surgical treatment instrument. That is, an elastic tube 132 is disposed  
20           so as to be closely fitted over the outer periphery of the proximate-end portion of a hold cylinder 131 from an inner surface of the hold cylinder 115, and a rubber member forming the elastic tube 132 is inner-molded with respect to the hold cylinder 131. A rib 133 which  
25           abuts on the outer periphery of the insertion sheath portion 17 is disposed on the inner surface of the elastic tube 132, and an engaging force with respect to

the insertion sheath portion 17 is enhanced.

The cleaning device according to the third embodiment of the present invention will be described with reference to FIGS. 13 to 16. For the cleaning  
5 device 100 according to the present embodiment, the front-end plate 102 in the cleaning device according to the second embodiment is removed, the front-end opening of the cylindrical member 101 is opened, and the front-end opening is used as a drain port 141 to  
10 constitute a cleaning cover 142. The drain ports 125 in the cleaning device 100 according to the second embodiment are not disposed. A plurality of supply nozzles 143 are disposed in the cylindrical member 101 of the cleaning cover 142, and inner ends of the supply  
15 nozzles 143 form a jet ports (water supply ports) 145 in the inner surface of the cylindrical member 101. Any of the respective jet ports 145 surrounds the cleaning region where the cleaning object is disposed in the cleaning cover 142, and the jet port is disposed  
20 so as to be directed to the cleaning region from the periphery. Here, three supply nozzles 143 are disposed, and the supply nozzles 143 are arranged so that the water is equally radiated in three directions from the center of the cleaning cover 142.

25 When the cleaning device 100 of the present embodiment is used, the high-pressure cleaning water is spouted toward the distal-end function portion 21 of

the cleaning object disposed in the cleaning cover 104  
via three jet ports 145. Moreover, the cleaning is  
possible in which the cleaning water is spouted from  
three peripheral directions. Therefore, even the  
5 strong dirt can be removed, and every corner can  
strongly be cleaned without any unevenness.

The cleaning water which has overflowed in the  
cleaning cover 104 can be drained to the outside of the  
cleaning cover 104 from the drain port 141 which  
10 largely opens forwards. The other constitution is  
similar to that of the cleaning device according to the  
above-described embodiments.

As described above, according to the cleaning  
device of the present invention, for the medical  
15 instrument, especially the treatment portion which  
easily strongly becomes dirty can efficiently be  
cleaned.

Additional advantages and modifications will  
readily occur to those skilled in the art. Therefore,  
20 the invention in its broader aspects is not limited to  
the specific details and representative embodiments  
shown and described herein. Accordingly, various  
modifications may be made without departing from  
the spirit or scope of the general invention concept as  
25 defined by the appended claims and their equivalents.